



Introduction

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SPEAKER – Markku Ursin

- Team Leader at Movial since 1/2003
- Movial:
 - Finnish SW company concentrated on embedded Linux
 - Services – Embedded Linux product creation services; Interaction design
 - Products – Instant Messaging/VoIP/Presence applications

CONTENTS

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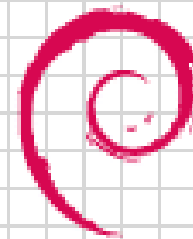
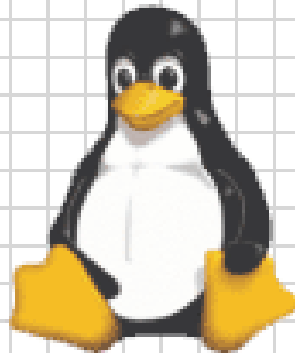
BACKGROUND: SCRATCHBOX

- Cross-compilation environment for embedded SW
- Sandboxed environment inside an ordinary Linux PC
 - Sandbox: just those libraries that are available on the target => `./configure` scripts will run smoothly; easy porting
 - Target emulation using a CPU transparency device or emulator => easy development and testing and no need for a test device for every developer. Test programs run by `./configure` are automatically executed on target.
- Used e.g. as a part of Nokia's maemo.org platform
- Key technology in DeviceLinux, but there is much more to it...

INTRODUCTION -- WHAT?

- OSS project for getting Linux into devices easily
- Open and royalty-free development environment
- SDK: Tools for creating target distributions
 - Complete control over all components
- Platform: packaged sw components
- Built around Debian and Scratchbox and other well known OSS components
- Support for common Linux development tools

TECHNOLOGIES



debian



INTRODUCTION -- WHY?

- It can be done (relatively easily) based on Scratchbox
 - Market need for an(other) open source alternative
 - SW porting is easier using DeviceLinux and Scratchbox than with the alternatives => support for a large variety of architectures is available more quickly
 - Large set of sw components
 - No license fees
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INTRODUCTION -- WHO?

- COSS – Center of Open Source Software (Finland)
- Device Linux Partners sponsoring
 - Movial Corporation
 - Nomovok Ltd

INTRODUCTION -- WHEN?

- Ideas emerged during development of Scratchbox
- Publically announced at LinuxWorld/NY (May 2005)
- Most components available immediately
- Integration work ongoing
- First version in the autumn 2005

PROJECT GOALS

- Complete set of tools for developing Linux platforms for embedded devices
 - Facilities and instructions for the porting process
 - Provide complete control over the distribution – everything can be built from sources.
 - Customizability
 - Modularity
 - Extendability
 - *Proprietary components*
 - *New OSS components*
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DEVICELINUX PROVIDES

- SDK: Development tools (config files for them)
 - Scratchbox, Eclipse, gdb, gprof,...
- Platform: Core SW, Middleware, and applications
 - Source debian packages
- Subprojects for different architectures
 - Configuration files for development tool
- Information about how to create a new subproject
 - HW integration instructions
- Infrastructure

 - Web page, mailing lists, version control

DEVICELINUX DOES NOT PROVIDE

- Kernel

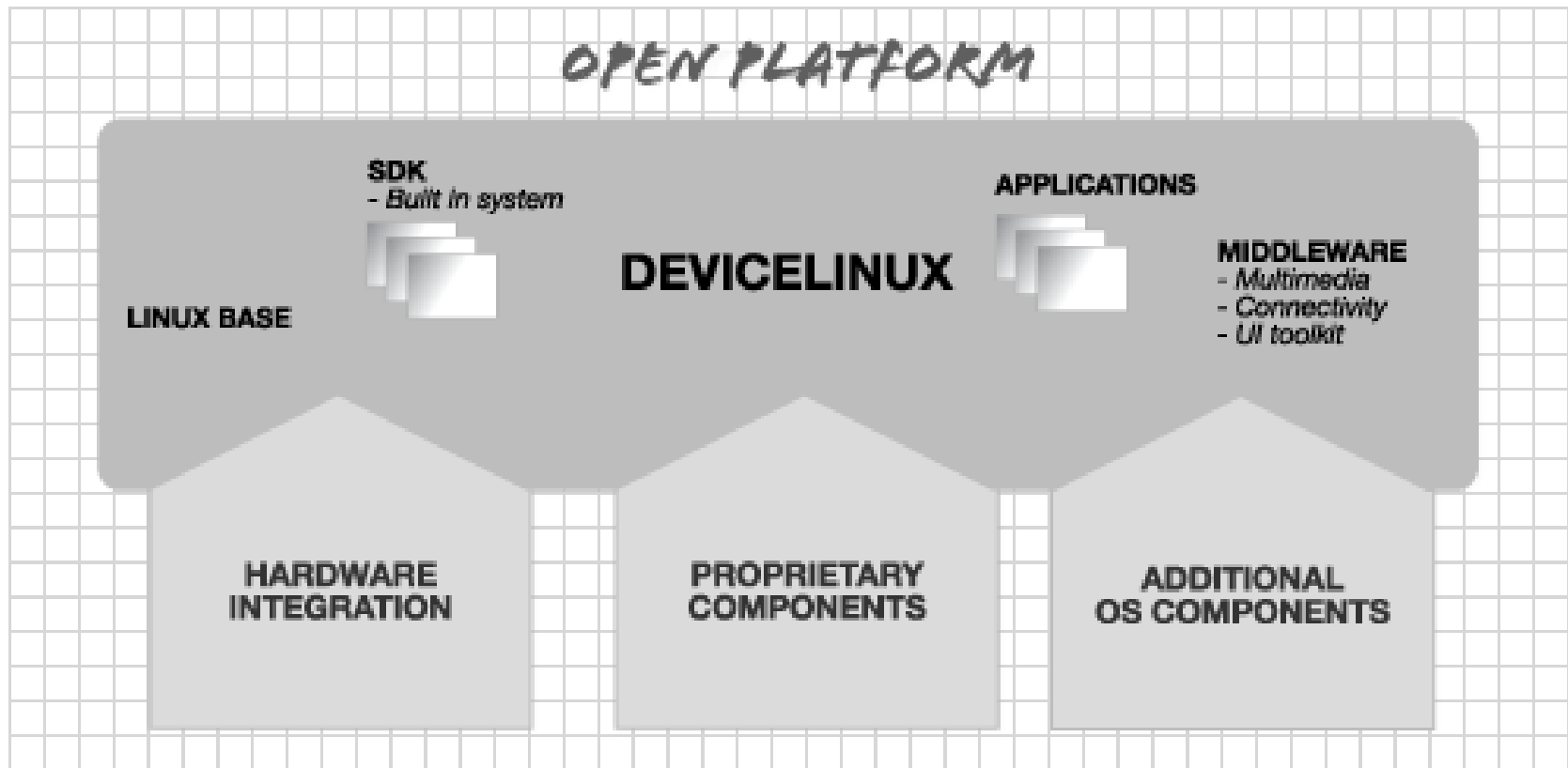
TARGET DEVICES

- Network-enabled (Wired or wireless)
- Architecture requirement: Linux support
- Set-top-boxes, PDA's, phones, ...

HOST REQUIREMENTS

- Requirements for the development machines:
 - Any Linux distribution
 - Debian packages will be supported first

TECHNICAL OVERVIEW



TECHNICAL OVERVIEW

- SDK
- Core software
 - Libraries, middleware
- Applications
 - Browser, e-mail, calendar, games,
- Extensions
 - Proprietary sw (drivers, databases, etc.)

SDK

- Rebuild entire distribution from sources
- Customize all distribution parts
 - Compile-time arguments
- With the pre-configured tools and easy-to-use emulation environment, developers can concentrate on application development instead of constantly tuning the development environment.

SDK: SCRATCHBOX

- Consistent cross-compilation build system
- Multiple processor architectures (ARM, X86, PPC, MIPS, CRIS)
- Designed for supporting porting for new architectures
- Pre-configurable for different targets

SDK: CROCODILE

- Aims at cross-compiling Debian from scratch
 - Currently, embedded debian builds are done using target HW
 - Primary problem: circular build dependencies between Debian packages
 - Provides the necessary enhancements to Scratchbox 1.0 and publishes instructions and scripts for managing the build.
 - Timeframe: ready in July 2005
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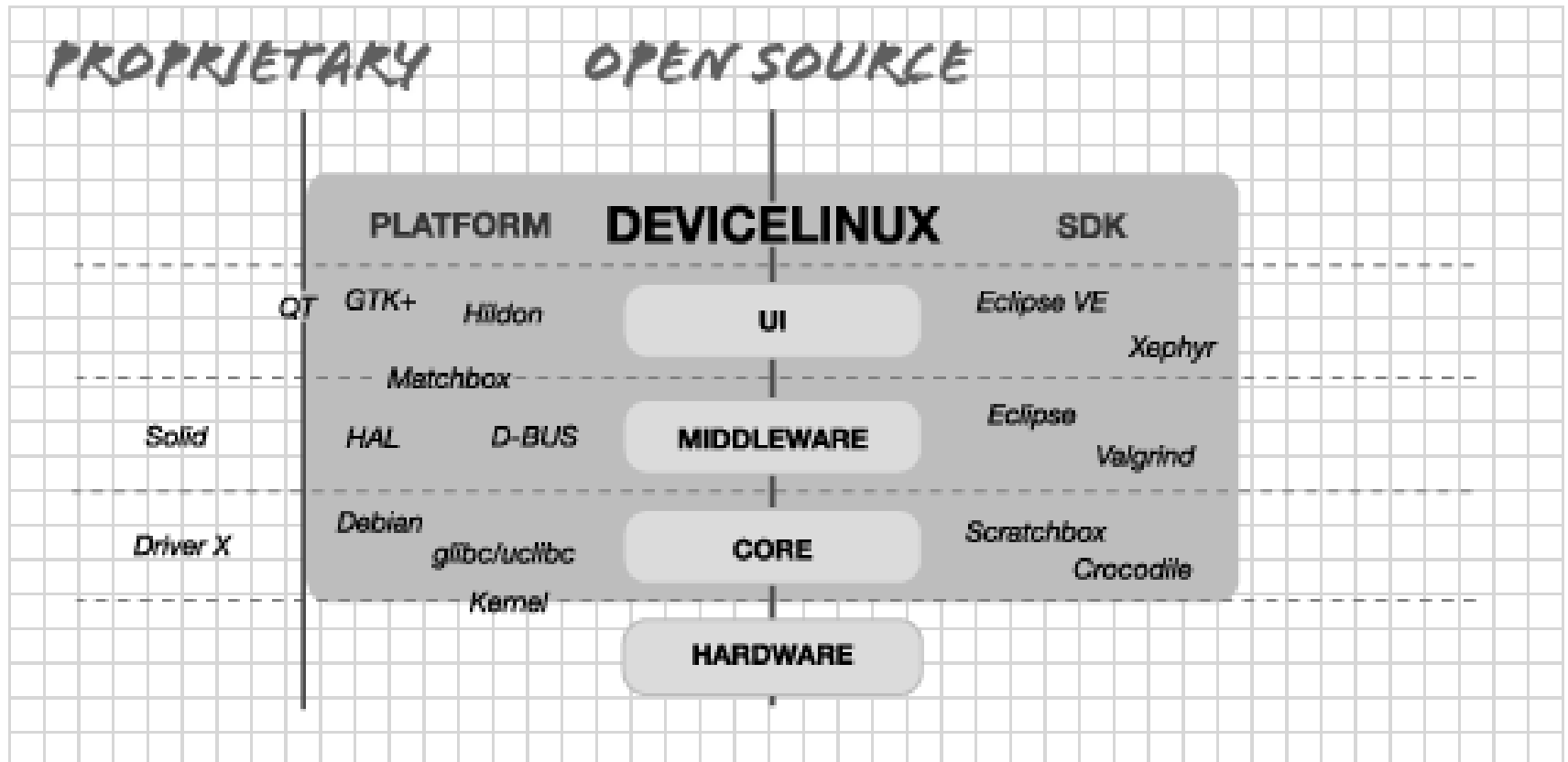
SDK: DEVELOPMENT TOOLS & IDE

- Normal Linux development tools (gdb, gprof, valgrind, kcachegrind,...)
 - IDE: Eclipse
 - Build system integration
 - Debugging tools integration
 - Visual GUI builder (Gazpacho, Glade)
 - All tools usable both from command line and the IDE
 - Framework for test automation (Xnee)
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SDK: TARGET EMULATION ENVIRONMENT

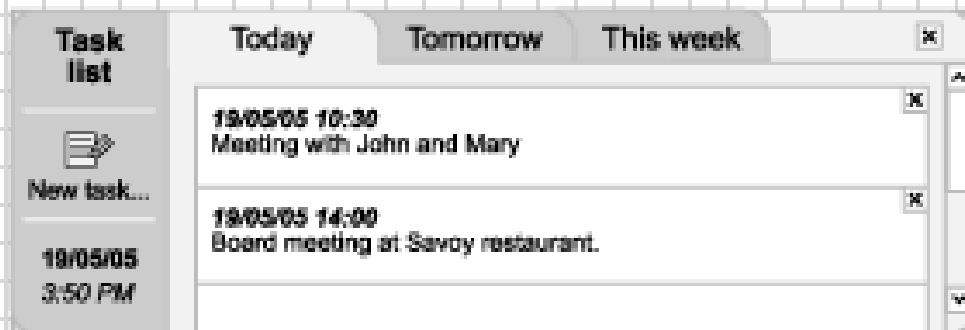
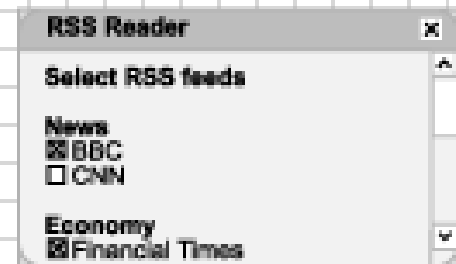
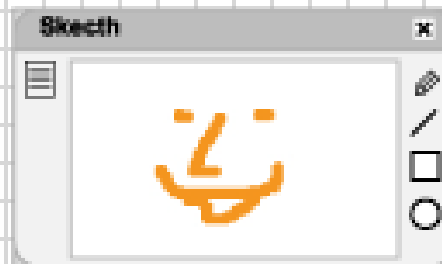
- SW Emulator or a CPU transparency device
- Access target device from your developer pc
- Display forwarding: Xephyr, Xnest
 - Target screen is shown in a window on the developer pc
- Development hardware shared between developers

CORE SOFTWARE



APPLICATIONS

EXAMPLES OF APPLICATIONS



APPLICATIONS

- Basic applications ready for customization:
 - Browser
 - E-Mail
 - Calendar
 - Games
 - PDF-Viewer
 - ...
- All are localizable

SUPPORT

- DeviceLinux web site forum
- Commercial Linux available via DeviceLinuxPartners.com, e.g. Movial
 - Porting services
 - Customization
 - Application development

EXAMPLE PROCESS

1. Company (person) X wishes to get Linux on their hardware.
2. Check if a subproject for the architecture already exists. If yes, use it, otherwise...
3. Check the deviceLinux site for information about HW integrateino
4. Contact deviceLinux.org for creation of subproject.

EXAMPLE PROCESS...

- Within the subproject, configure tools for the hardware
- Compile needed SW components from scratch
- Develop applications
- Create & deploy the distribution

EXAMPLE APPLICATION

- Movial SIP/VoIP client for ARM platforms
 - Osip SIP stack
 - Movial Presence Engine presence framework
 - GStreamer multimedia framework
 - Codecs using the OMAP 15/16/1710 DSP via dspgateway
 - GTK+ GUI
- Currently running on the TI innovator board

SUMMARY

- **SDK**
 - Pre-configured tools for building the complete embedded distribution
 - Support for multiple architectures
 - Shared target emulation between developers
 - **Platform**
 - Core, Middleware, and application software
 - **Key technologies:**
 - Scratchbox, Debian, Eclipse, GTK+, Gstreamer, ...
 - **Support**
 - Available via DeviceLinuxParters
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MORE INFORMATION

- <http://www.devicelinux.org/>
- <http://www.devicelinuxpartners.com/>
- <http://www.scratchbox.org/>
- <http://www.movial.fi/>

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